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TASKS OF THE GDR RESEARCH INSTITUTE FOR WATER TRANSPORT,
HYDROGRAPHY, AND PEDOLOGY

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Dir of the Inst

The Research Institute for Water Transport, Hydrography, and Pedology was founded, after 1945, by merger of four independent institutes at the instance of the Directorate General of Water Transport. It is divided into five sections:

- Section I, Hydrography
- Section II, Hydraulic Engineering
- Section III, Foundation Engineering
- Section IV, Navigation and Traffic Signals
- Section V, Ship Measurement

These different fields of work were brought together principally to keep in existence the institutes important for water transport. But the tasks of a scientific institute can never be so narrowly circumscribed as to belong exclusively to the subjects administered by a single authority. The work of the institute, therefore, also enters fields which do not entirely belong to the sphere of transportation. In the following, however, those tasks which are most important for transportation will be especially emphasized.

Section I, Hydrography, is the successor of the former National Institute for Hydrography and Water-Level Measurement. Its most important function is the publication of the German Hydrographic Yearbook for the territory of the German Democratic Republic, which furnishes to the waterway offices, the water-economy administrations, and other authorities concerned the

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statistical bases for hydrographic investigations and scientific research. The yearbook gives a compilation of the following data on the first-order water levels of surface waters arranged by river basins, the daily water levels, the statistically computed principal values (low water, mean water, high water) for the separate months, the extreme values of water levels, the semiannual and annual values, ice conditions, runoffs with corresponding principal values, and for certain stations, water temperatures as well. The readings taken from wells of the first order are processed for ground-water observation. The principal values of the ground-water levels for these stations are also given in the yearbook.

The war has caused a considerable delay in current processing of the yearbook. The prewar period terminated with the 1939 yearbook. From 1945 to 1951, the 1940 and 1946 yearbooks have been issued. The 1941 and 1947 issues will follow in 1952. So as to avoid further interruption of the current processing, the missing issues for the war period will be interpolated at a later date.

Besides the yearbooks, the Hydrography Section has also issued the "New Edition of the Regulations for Water-Level Measurement," containing all instructions for setting up and reading watermarks, rules for runoff measurements, directives for ground-water observation, directives for measuring water temperatures, and hydrographic bibliographies for 1941 and 1942 - 1944.

To obtain trustworthy water-level data, the elevation of the watermarks must be determined in relation to fixed geometric points. The section, therefore, has the task of constantly checking the levels of the watermarks in cooperation with the waterway offices, and determining any changes in elevation.

Since runoff measurements, which are very important, were hampered by the lack of suitable instruments for this purpose, which were previously obtainable only in the West Zone, the institute, in cooperation with industry, has developed a new metering vane which represents an improvement over the type currently used in West Germany.

Alongside of these current works, which are mostly statistical in nature, the Five-Year Plan has prescribed important research projects in hydrography. The formulation of a general plan for the water economy will be a very extensive task for to utilize to the best advantage for the national economy the water resources available to the German Democratic Republic, which represent something of a bottleneck, it is necessary to conduct a planned water economy that seeks to attain compromise and mutual adjustment between the sometimes conflicting interests of water transport, power generation, water supply, flood protection, fisheries, etc. The task of the institute is primarily to lay down the scientific foundation for this general planning.

Further themes for research are issue of a new edition of flow data for the Elbe River, execution of precision determination of elevation on the Baltic Sea and the Elbe River, qualitative studies of surface and subsurface waters, and investigation of the relation between precipitation and runoff.

Section II, Hydraulic Engineering and Water Transport, is the successor of the former Prussian Research Institute for Hydraulics, Earthwork Engineering, and Shipbuilding. In consequence of the extensive destruction of the laboratories on Schleusen Island in the Tiergarten Park, most hydraulic research has now shifted to the two field stations: the Karlshorst laboratory and the open-air site at Potsdam. Hydrometric instruments such as Woltmann vanes, Pitot tubes, etc., are calibrated here. The Potsdam field station has been particularly expanded through construction of a large laboratory, a central pumping station, and other new research installations. Hitherto, investigations at the open-air site were only carried out on large-scale models, necessitating interruption of the work during the winter; however, in the future, it will be possible to carry on continuous research on smaller models in the laboratory.

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The principal task of Section II is the hydraulic study of models to clarify problems arising from constructions planned by the various authorities concerned with transportation. Such studies cover river improvement, canal works, seaport construction and beach protection, sluice installations, canal locks, barrages and dams, inlet and outlet structures, dikes and spillways, siphons, pipes, and gate valves, as well as movement of silt and alluvial detritus. As an example, a few of the research projects undertaken for the Directorate General of Water Transport may be mentioned: Experiments for the section of the Elbe River, near Schoenebeck, were carried out to find the best solution for the regulation of a current crossover, that is, a curved stretch of river where the main current shifts from one bank to the other. The necessary depth for navigation is obtained in such cases by narrowing the stream bed with groins and dikes, etc. Since such construction is very expensive, it is desirable to be certain about the most expedient and economical installation before work is started; and this certainty can be attained by experiments on models. In the study for the location of the mouth of the canal from the Rothensee lock into the Elbe River, the object is to reduce to a minimum the silting between that mouth and the entrance to Magdeburg harbor, which results from the deposition in the Elbe River of alluvium carried by the canal waters. Another experiment concerned the new barrage to be constructed at Magdeburg, by means of which the rocky stretch of river above Magdeburg was to be overdammed. The principal task here was to find the best method of developing the stilling basin and the installations.

A number of large-scale studies for the Directorate General of Water Transport are envisaged by the Five-Year Plan, including model experiments for development of a harbor entrance and other model experiments to clarify the flow conditions and motion of alluvium along a new navigation channel.

It is the mission of the section, as the leading body for hydraulic experimentation, to further the development of theory and experimental practice by appropriate research work. With this in view, research is scheduled, among others on the similarity of the motion of alluvium in models and in nature, and this research will be extended to include artificial substances. Also planned is research on the effect of channel cuts, on the action of waves on structures, and on expedient measures for shore protection.

Section III, Foundation Engineering, was formerly the so-called Earthwork Engineering Section of the Prussian Research Institute. It had lost all of its equipment and all of its scientific documentation and material during the war. This total loss, which at first hindered the reconstruction that began in 1947, led, nevertheless, to the institute's being equipped at present entirely with the best modern instruments. The most important tasks of the section are examination of earth samples for foundations and earthworks; static calculations of the bearing capacity of the subsurface, requirements it must meet, loads to be imposed, and its settlement or subsidence; static calculations of earth pressure; danger of slides, etc. Its tasks also include giving expert opinions about local earth conditions on building lots, including questions of ground water, and the effects of construction and mining operations; drawing plans for projected construction, as well as consultation in layouts and difficult foundation problems.

The following projects may be mentioned of those carried out for the Directorate General of Water Transport: examination and opinion on the foundation site for the quay retaining wall on the Neuer Strom River in Warnemuende, determination of the constants and the degree of compaction of the ground and calculation of the lock floor for the Neustadt-Glewe lock, opinion on the foundation site for Lock IV of the Niederfinow flight of locks and expert opinion on damage having occurred there, ground and static earth examinations for the southern quay retaining wall in the Elbe port of Riesa, opinion on the foundation

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site for the new construction of the Brederiche Lock near Fuerstenberg, and expert testimony on the structural condition, as of that time, of the east mole at Warnemuende and testing its stability.

The Five-Year Plan envisages the following tasks of research and development: development of modern boring methods for taking test borings on building sites, determination of the allowable maximum load on building plots and of the stability of foundations as a function of the maximum load, determination of the aggregation particle size of sandy earths by settling in water, and simplification of testing and calculation procedure in the design and construction of barges.

Section IV, Navigation and Traffic Signals, has developed out of the former field of research in sea navigational aids. The tasks of this section are repair and technical testing of the beacons on the Baltic coast of the German Democratic Republic and in inland waters; development of new light signal equipment; establishment of new beacons, directional beacons, sector beacons and fog signals; installation and alteration of remote control for beacons; and optical and light-technical calculations, as well as advisory consultation with, and giving expert opinions for, the waterway offices. The section does most of its work, by order of the Directorate General of Water Transport, in beacon repair and construction of new beacon apparatus. The new installation of the navigational lights for the port of Wismar is an extensive program for this year.

The optical studies of the section could also be applied to advantage to railroad signal systems and to traffic signals for automobile traffic. Cooperation with the corresponding agencies of the transportation system is rendered all the more desirable by the absence, at present, of any other institution equipped to make such studies within the ambit of the Ministry of Transportation.

The following themes for research have been assigned under the Five-Year Plan: study of the respective visibility of white and colored lights at various degrees of atmospheric transparency; testing of light sources most recently developed, a subject of economic urgency because of the lack of special lamps for use in beacons; development of standard types for beacon installations with special reference to their standardization; development of beacons and other signal installations for use on lightships; and development of modern radio beacons.

Section V, Ship Measurement, is the successor of the former Reich Ship Measurement Office. Its tasks are control of ship measurement for inland and ocean-going vessels in the territory of the German Democratic Republic, checking on and supplying the measuring instruments ordered by the measurement offices, as well as issuance of technical instructions to the measurement regulations. The most important work up to now has been in the field of inland ship measurement, but as a result of the shipbuilding program now beginning under the Five-Year Plan, the activity in the field of ocean-going ship measurements will increase further.

This condensed review gives only part of the very comprehensive field covered by the work of the institute. In view of the intertwining of problems of many fields, the services of the institute for the solution of scientific problems are also requested by other administrations, municipalities, and people-owned enterprises. The institute is carrying out projects on a scale hitherto unknown in Germany.

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